REMARKS

Claims 66-100 are pending. Claims 70, 71 and 77 have been withdrawn. Claims 66-69, 72-76, and 78-100 are rejected. By this amendment, Claims 66 and 83 have been amended. Claims 101-107 have been added, and 101-105 and 107 are dependent claims. Claim 101 recites the enzyme amylase for which support may be found at least in Example 9; claims 102 and 103 claim a barrier layer of an inorganic salt and titanium dioxide for which support may be found at least in Table 3, H. Claims 104 and 105 recite both a barrier layer and an outer coating for which support may be found at least in Example 4. Claim 106 is an independent claim to a granule having an enzyme matrix over a core, a barrier layer, and an outer coating. Dependent claim 107 specifies barrier materials and outer coating materials.

The Examiner is thanked for his facsimile of December 23, 2002, removing the "final" status of the December 5, 2002, rejection. The Examiner also is thanked for removing the previous rejections based upon Kiesser et al. (US Pat. No. 5,739,091)and Martussen et al. (US Pat. No. EP 304332).

35 USC § 112 Rejection

Claims 66-69, 72-76, and 78-100 are rejected as introducing new matter, specifically, the language "non-fibrous" in claims 66 and 83. It is the Examiner's position that use of "fibrous" to describe cellulose art in the background section in combination with the solubility language for the cellulose described in the specification is insufficient support for use of the term "non-fibrous" to describe cellulose. Applicants have removed the term from claims 66 and 83.

35 USC § 103(a) Rejection

All claims are rejected as unpatentable over Arnold et al. (US Pat. No. 5,324,649). It is the Examiner's position that:

> The reference teaches enzyme-containing granules which comprise a core having a seed particle in it (col. 4, line 13), and protein (enzyme) matrix surrounding it (col. 5-6). The enzyme matrix contains, besides the enzyme itself, other peptides and proteins (col. 5, line 36,37). In addition, proteins, such as casein, albumin, etc. may be used as adjunct ingredients (Col. 7, past paragraph). The enzyme can be selected, for example, from proteases, amylases, lipases, cellulases. Further, the enzyme layer comprises plasticizers, such as sugars or sugar alcohols (col. 6, lines 13, 14). Further, both the core and the enzyme layer can

contain coating comprising a vinyl polymer or vinyl copolymer. Also, synthetic polymer, such as PVA can be added to the enzyme matrix (col. 5, lines 53-55).

Arnold does not specifically teach use of polysaccharides. However, the reference teaches that the granules may contain adjunct ingredients, in particular enzyme protective agents. Thus, it would be obvious to add to enzyme matrix an enzyme protective agents. Selection of various enzyme protective agents would be obvious to an artisan. One of often used enzyme stabilizers is starch. See, for example, US 5,254,287 (col. 4, line 22), or US 5,260,074 (col. 1, lines 51-54). Addition of starch to granules disclosed in Arnold will result in the invention as instantly claimed. As intended use of polysaccharide as "structuring agent", motivation in the prior art to combine references need not be identical to that of the applicant to establish obviousness.

Applicants respectfully disagree with the Examiner's conclusions regarding the '649 Arnold et al. patent. While the Examiner is correct in stating that Arnold et al. do not teach the use of polysaccharides as claimed by Applicants, the Examiner is not correct in stating that Arnold teaches or suggests a "matrix" as described and claimed by Applicants.

Col. 5-6 of Arnold et al., instead of describing a protein matrix, describe only the use of conventional enzyme slurries and conventional "fermentation broth which typically include other proteins, peptide, carbohydrates, other organic molecules and salts". Col. 5, lines 32-37. There is no mention of a matrix of protein mixed together with a combination of a sugar and a polysaccharide structuring agent when describing the enzyme component. The enzyme fermentation broth or slurry is then combined with a vinyl polymer or vinyl copolymer, such as PVA, with reduced water solubility in the case of fully hydrolyzed PVA, as described in Col. 5-6 of Arnold el al. The PVA in the enzyme layer is not stated to be an optional ingredient. This mixture of PVA and fermentation broth/slurry is used to coat a core, as shown in the examples. Optional ingredients that may be added to the enzyme in Arnold et al. include plasticizers (sugars, sugar alcohols or polyethylene glycols, ureas, dibutyl or dimethyl phthalate, or water) or anti-agglomeration agents (talc, TiO2, clays and amorphous silica). Col. 2, lines 40-45 states that a preferred embodiment of the enzyme layer is "a PVA either alone or in combination with additional agents such as plasticizers or anti-agglomeration agents". No particular advantage is

recited for any of the plasticizers and anti-agglomeration agents. Arnold et al. further state that other adjunct ingredients may be added to the enzyme granules, including metallic salts, solubilizers, activators, anti-oxidants, dyes, inhibitors, binders, fragrances, enzyme protecting agents/scavengers such as "ammonium sulfate, ammonium citrate, urea, guanidine hydrochloride, guanidine carbonate, guanidine sulfanate, thiourea dioxide, methylanolamine, diethanolamine, triethanolamine, ".

Properly considering the Arnold et al. reference as a whole, including the examples, leads to a granule having an inert core with or without a PVA coating, a layer of enzyme fermentation broth or slurry with a vinyl polymer, an optional salt layer with or without PVA and TiO2 over the enzyme layer, and a final protective coating layer (TiO2, PVA). The enzyme layer may further contain an optional plasticizer or anti-agglomeration agent. If a plasticizer is added and a sugar happens to be selected from amongst the list of plasticizers, the resulting granule would not have a matrix of protein, sugar and polysaccharide. Then, if additional adjunct ingredients were selected from the list of column 7, and the selection happened to be any of the recited list of enzyme stabilizers, the granule still would not have a matrix of protein, sugar and polysaccharide.

It is the Examiner's position that starch is a known enzyme stabilizer as mentioned in US Pats Nos. 5,354,287 and 5,260,074; however, the '287 and '074 patents do not teach any particular advantage to any of the multiple listed stabilizers; and, they do not teach a protein matrix of protein, sugar and polysaccharide. Additionally, Arnold et al. provide a list of 10 stabilizers, which significantly does not include polysaccharides, so there is no motivation to look to the '287 and '074 patents without some teaching of particular benefits to the use of particular stabilizers.

Further, even if an optional polysaccharide were picked out of the list in the '074 or '287 patents for addition to the Arnold et al. granule, the sugar component might not be present since it also is only one of a list of an optional ingredient . Even if the unlikely selection of a sugar plasticizer were to be added and a polysaccharide from the '287 or '074 patent were to be added, there still is no teaching to combine the sugar and polysaccharide with the protein to form a matrix as described by Applicants.

Three requirements must be met to make a valid obviousness rejection. First, the prior art relied upon must contain some suggestion or incentive to modify the reference. Second, the modification must have a reasonable expectation of success determined from the point of those skilled in the art at the time the invention was made. Third, the prior art reference must teach or suggest all of the claim limitations. "It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor." Northern Telecom v. Data point corp., 908 F.2d 931, 934.

The selection of the combination suggested by the Examiner is not fairly suggested in the prior art, impermissibly picks and chooses ingredients without considering the inventions as a whole, and looks suspiciously like hindsight reconstruction reached through the teachings of Applicants' disclosure. At best, the analysis is obvious to try.

If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is encouraged to call the undersigned at (650) 846-4072.

Respectfully submitted,

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STATUS OF THE CLAIMS

Claims 1- 65 (cancelled)

66. (Currently amended) A layered granule having a single seed particle, the layers comprising:

a) a protein matrix layered over the seed particle wherein said matrix includes a protein mixed together with a combination of a sugar or sugar alcohol and a [non-fibrous] polysaccharide structuring agent; and

b) an outer barrier layer or coating.

G1 SUB H1)

67. (Previously added) The granule of claim 66, wherein the protein is mixed together with a sugar.

68. (Previously added) The granule of claim 67, wherein the sugar is selected from the group consisting of glucose, fructose, raffinose, maltose, lactose, trehalose, and sucrose.

69. (Previously added) The granule of claim 68, wherein the sugar is sucrose.

70. (Withdrawn) The granule of claim 66, wherein the protein is mixed together with a sugar alcohol.

71. (Withdrawn) The granule of claim 70, wherein the sugar alcohol is selected from the group consisting of mannitol, sorbitol and inositol.

72. (Previously added) The granule of claim 66, wherein the polysaccharide structuring agent is selected from the group consisting of starch, modified starch, cellulose, modified cellulose, carrageenan, gum arabic, xanthan gum, locust bean gum, and guar gum.

73. (Previously added) The granule of claim 72, wherein the polysaccharide is a starch or modified starch.

74. (Previously added) The granule of claim 66, wherein the protein is an enzyme.

75. (Previously added) The granule of claim 74, wherein said enzyme is selected from the group consisting of proteases, amylases, lipases, and cellulases.

76. (Previously added) The granule of claim 74, wherein the enzyme is mixed together with a sugar.

77. (Withdrawn) The granule of claim 74, wherein the enzyme is mixed together with a sugar alcohol.

78. (Previously amended) The granule of claim 66 having a coating layered over the protein matrix.

79. (Previously added) The granule of claim 78, wherein the coating is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, cellulose derivative, polyethylene glycol, polyethylene oxide, chitosan, gum arabic, xanthan and carrageenan.

80. (Previously added) The granule of claim 79, wherein the coating layer comprises a cellulose derivative.

81. (Previously added) The granule of claim 80, wherein said cellulose derivative is selected from the group consisting of methylcellulose, hydroxypropyl methylcellulose, hydroxycellulose, ethylcellulose, carboxymethyl cellulose, and hydroxypropyl cellulose.

82. (Previously added) The granule of claim 66 further comprising a synthetic polymer selected from the group consisting of polyethylene oxide, polyvinyl alcohol, polyvinyl pyrrolidone, polyethylene glycol and polyethylene oxide/polypropylene oxide.

83. (Currently amended) A layered enzyme granule having a single seed particle, the layers comprising:

G2
Sub H1

a) an enzyme matrix layered over the seed particle wherein said matrix is 20 to 80% by weight of the layered granule and includes an enzyme mixed together with a combination of a sugar and a polysaccharide structuring agent, said enzyme selected from the group consisting of proteases, amylases, lipases and cellulases and said polysaccharide structuring agent selected from the group consisting of starch, modified starch, [non-fibrous] cellulose, modified [non-fibrous] cellulose, carrageenan, gum Arabic, xanthan gum, locust bean gum, and guar gum; and

b) an outer barrier or coating.

84. (Previously amended) The enzyme granule of claim 83 further comprising a coating layered over the enzyme matrix.

85. (Previously amended) The granule of claim 83, wherein said sugar is selected from the group consisting of glucose, fructose, raffinose, maltose, lactose, trehalose and sucrose.

86. (Previously added) The granule of claim 85, wherein the sugar is sucrose and the polysaccharide is starch or modified starch.

87. (Previously added) The granule of claim 83, wherein the enzyme is a protease.

88. (Previously added) The granule of claim 83, wherein the enzyme is a cellulase.

89. (Previously added) The granule of claim 66 wherein a ratio of the sugar or sugar alcohol to the polysaccharide structuring agent in the protein matrix is 0.1 to 90% by weight of the protein matrix.

90. (Previously added) The granule of claim 83 wherein a ratio of the sugar to the polysaccharide structuring agent in the enzyme matrix is 0.1 to 90% by weight of the enzyme matrix.

91. (Previously added) The granule of claim 66 having a barrier layer over the protein matrix layer.

92. (Previously added) The granule of claim 91 wherein the barrier layer is selected from the group consisting of inorganic salts, organic salts, and the combination of the sugar or sugar alcohol and structuring agent.

93. (Previously added) The granule of claim 66 wherein the barrier layer is an inorganic salt.

94. (Previously added) The granule of claim 66 wherein the barrier layer is magnesium sulfate.

95. (Previously added) The granule of claim 83 having a barrier layer over the enzyme matrix layer.

96. (Previously added) The granule of claim 95 wherein the barrier layer is selected from the group consisting of inorganic salts, organic salts, and the combination of the sugar and structuring agent.

97. (Previously added) The granule of claim 83 wherein the barrier layer is an inorganic salt.

98. (Previously added) The granule of claim 83 wherein the barrier layer is magnesium sulfate.

99. (Previously added) The granule of claim 66 having an outer barrier layer over the protein layer and a coating over the barrier layer.

100. (Previously added) The granule of claim 83 having an outer barrier layer over the protein layer and a coating over the barrier layer.

G3 SUB H1)

101. (New) The granule of claim 83 wherein the enzyme is an amylase.

102. (New) The granule of claim 66 wherein the barrier layer is an inorganic salt and titanium dioxide.

103. (New) The granule of claim 83 wherein the barrier layer is an inorganic salt and titanium dioxide.

104. (New) The granule of claim 66 having a barrier layer and a coating.

105. (New) The granule of claim 83 having a barrier layer and a coating.

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106. (New) A layered granule comprising:

a) a single seed particle;

a) an enzyme matrix layered over the seed particle wherein said matrix includes at least one enzyme mixed together with a combination of a sugar and at least one polysaccharide structuring agent and constitutes from about 20 to 80% by weight of the layered granule;

b) a barrier salt layered over the enzyme matrix layer; and

c) an outer coating over the barrier layer.

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107. (New) The layered granule of claim 109 wherein the sugar is sucrose; the polysaccharide structuring agent is one or more starches, the barrier salt is magnesium sulfate, and the outer coating is selected from one or more of polyvinyl alcohol, titanium dioxide and a surfactant.